

# Modern Technology Used to Determine Extent of Underground Mine Fire

*By Tim Wilson, Environ. Scientist  
Surface Mining Section*

For the second time in two years a local agency is assisting the Kansas Department of Health and Environment (KDHE) through the use of a thermal imaging camera in determining the extent of an underground coalmine fire burning near the town of Mulberry (approximately 20 miles north of Pittsburg).

KDHE's Surface Mining Section (SMS) is receiving help from the Crawford County Local Emergency Preparedness Coordinator (LEPC) and Crawford County's thermal imaging camera to detect underground temperature differences to locate the extent of the underground fire.

Crawford County officials acquired this unique camera to search for victims of disasters such as tornados, but also use it in law enforcement investigations, missing person searches, and to track down fleeing suspects hiding in dense vegetation. The camera's thermal imaging properties, using infrared technology, allow authorities to "see through" building walls and vegetative cover by detecting the temperature variations between persons and their surroundings.



**KDHE crews survey the extent of the underground mine fire through the use of Crawford County's thermal imaging camera.**

On Oct. 12, SMS emergency program personnel responded to a call from a local landowner concerning dying vegetation and acrid smoke arising from the ground near their residence. Upon arrival at the site, the landowners explained that approximately three weeks prior they had been clearing and burning brush on an abandoned coal mine area on their property. Subsequently they noticed that smoke continued to emanate from the ground long after the brush fire had burned out and two large trees had died and fallen over.

The owners stated they had attempted to extinguish the underground fire by saturating the affected area with water from a garden hose. According to the owners, this only served to produce large amounts of steam. They then called the SMS to report the fire. The SMS investigators observed an area approximately twenty feet by twenty feet on the ground surface that was devoid of vegetation and smoldering.

From previous experience, the investigators knew that the effects being seen at the surface might not show the full extent of the burning going on beneath the ground. In July of 2002, the SMS responded to a similar situation approximately two miles southwest of the present site and found much the same type of evidence of an underground fire. This landowner reported that the area had been smoldering and growing in size over the prior six months. He had not reported the fire because his neighbors had told him that it would burn out on its own. When it became obvious that the fire was spreading in extent and dry summer conditions were allowing more surface vegetation to ignite he contacted the SMS.

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A SMS employee familiar with the Crawford County LEPC suggested that the thermal imaging camera might be available to see just how far the fire had spread underground. SMS investigators met with the LEPC before dawn and did a reconnaissance over the area with the camera. They were amazed to find that the fire extended much farther than originally estimated and could see evidence of large trees burning internally with the camera. The predawn hour was selected to avoid interference from sunlight and daytime ground warming.

In the most recent case, the LEPC once again cooperated by providing the thermal imaging camera for delineation of the extent of the fire. As previously found, the current fire is much larger than surface effects indicated. In both cases the owner's residences were, or are, in danger of being affected by the fire. Because the fire is burning underground within the shales, abandoned coal mine spoils, and possibly the coal seam, asking the local volunteer fire department to douse the fire with water is not a viable option as they do not have the necessary manpower and equipment to expose the material.

Extinguishing the current fire will be handled in the same manner as the 2002 fire. Large excavators will dig a cut off trench around the burning area to contain the fire and stop it from advancing further toward the residence. The excavator will then expose and spread the burning material while saturating it with large amounts of water. Once the fire is put out, the burned material will be reburied and the affected area will be covered with clay for revegetation with grasses. Funding for this type of project is provided by individual emergency grants to the state from the federal Office of Surface of Mining. The current project should be completed by the end of October.

Due to the hazardous nature of these fires and the extremely high costs of extinguishing them, KDHE advises against burning brush and other materials on the surfaces of abandoned coal mines.